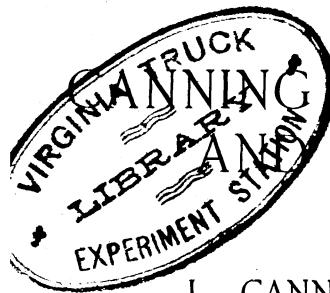


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U. S. DEPARTMENT OF AGRICULTURE.

FARMERS' BULLETIN 521.



TOMATOES AT HOME IN CLUB WORK.

I.—CANNED TOMATOES, CATCHUP, CHOW-CHOW, ETC.

BY

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*Assistant, Plant-Chemistry Laboratory,
Bureau of Chemistry.*

II.—CANNING TOMATOES IN CLUBS AND FOR MARKET.

BY

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Bureau of Plant Industry.*



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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
Washington, D. C., August 31, 1912.

SIR: We have the honor to transmit herewith a paper entitled "Canning Tomatoes at Home and in Club Work," prepared under the joint direction of the Special Agent in Charge of Farmers' Co-operative Demonstration Work, the Agriculturist in Charge of the Office of Farm Management, and the Acting Chief of the Bureau of Chemistry, and to recommend that it be published as a Farmers' Bulletin. This manuscript consists of two separate parts: (1) "Canned tomatoes, catchup, chowchow, etc.," prepared by Mr. J. F. Breazeale, Assistant, Plant-Chemistry Laboratory, Bureau of Chemistry, and (2) "Canning tomatoes in clubs and for market," by Mr. O. H. Benson, Specialist in Charge of Club Work, Office of Farm Management, of the Bureau of Plant Industry.

The purpose of this bulletin is to present practical methods of using canning outfits at home and out of doors in the canning clubs organized at school centers. It does not discuss the commercial or factory methods of canning, but is intended primarily to enable the girls on the farms to save many vegetables which now go to waste. It will be of great value in the demonstration club work.

Respectfully,

R. E. DOOLITTLE,
Acting Chief, Bureau of Chemistry.

B. T. GALLOWAY,
Chief, Bureau of Plant Industry.

Hon. JAMES WILSON,
Secretary of Agriculture.

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CANNING TOMATOES AT HOME AND IN CLUB WORK.

INTRODUCTION.

The canning of tomatoes has in recent years grown to be an important commercial industry. In the census year of 1909 there were 12,800,000 cases of 12 cans each packed in the United States. This immense pack exceeded the combined aggregate of any three other vegetables and was an increase of 37 per cent over the pack of 1904. It must be borne in mind that these figures refer to tomatoes used in commercial canning factories and do not represent the total product of the country which is otherwise used for the table, as catchup, various sauces, etc.

It is estimated that the area devoted to tomatoes in the home garden is equal to or greater than that employed in their field culture. Of the quantity grown in the garden a considerable surplus goes to waste and brings no return to the cultivator. To insure plenty of fruit for home use it is customary to set out about twice as many plants as are actually necessary. As this custom is common throughout the country the aggregate loss is considerable.

The theme of this bulletin is the use of the ripe and green tomatoes hitherto allowed to go to waste. By slightly increasing the garden plantation of tomatoes, many young people, ambitious for an education, will be able to can or otherwise preserve these products by a simple method, so that they can be turned into ready money to defray the expense of schooling. In a small way the tomato can do for the girl at home what the "pin-money pickle" did for the lady who invented that condiment.

In order that the canned product may find a ready market it must be put up in attractive form in containers suitable for commercial purposes and should bear a trade-mark which is distinctive and which will tend to hold the trade for the product as it gains a reputation in the market. One advantage of the home canning of tomatoes in

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comparison with other employment open to young people in the country is that it occurs during the vacation period. The large return in canned goods derived from a single acre makes the industry remunerative, and since the canning is done during the vacation season it can be carried on without interfering with school work. It is surprising how many tomatoes can be grown upon an acre and what little expense is involved in raising and preparing them for market.

I.—CANNED TOMATOES, CATCHUP, CHOW-CHOW, ETC.

By J. F. BREAZEALE,

Assistant, Plant-Chemistry Laboratory, Bureau of Chemistry.

CANNING TOMATOES IN GLASS JARS.

Almost everyone has canned tomatoes with more or less success. They are so easily kept in glass jars that a failure is almost inexcusable. There are a great many ways of canning tomatoes, depending upon the kind of jars used and the purpose for which they are intended. Cooking them in an open kettle, transferring them to jars, and sealing them while hot was probably the first and is still the most widely used method in home canning.

THE OPEN-KETTLE METHOD.

The open-kettle method of canning tomatoes is as follows: Select only sound and ripe tomatoes, dip them in boiling water for a few minutes, remove the skins, and then cut them up and place them in an open kettle, preferably an aluminum or porcelain-lined one, and salt at the rate of about 1 level teaspoonful to each quart. Bring slowly to a boil, stirring frequently to prevent scorching, and keep boiling for at least one-half hour or until the tomatoes are thoroughly done. If you are anxious to economize on jars, boil off all the surplus water until the tomatoes become thick.

If you are using the screw-top type, immerse the jars, tops, and rubbers in boiling water. Remove the jars one at a time, place a rubber around the neck, and fill with the boiling-hot tomatoes. Take the top of the jar from the boiling water, being careful not to touch the inside with the fingers for fear of introducing spores into the jar, and screw it on tightly. Invert the jar and let it stand in this position until cold. Have everything sterile that is put into the jar. When using a spoon, fork, or cup with the tomatoes, first immerse it in boiling water.

THE CLOSED-BOILER METHOD.

Another method of canning tomatoes, and the one which the writer always uses, is as follows:

Prepare the tomatoes as already described. Take off the skins and drop the tomatoes, as nearly whole as possible, into wide-mouth jars. Pack them in until the jar is full and add 1 level teaspoonful of salt to each quart. Put on the rubber and top and fix the spring as shown on the jar in figure 1. This will leave the top loose and allow the steam to escape during the boiling.

In the wash boiler or sterilizer (see p. 11 for description) set as many jars upon the false bottom as the boiler will conveniently hold and pour in enough cold or tepid water to come about 2 inches up on the jar. It is not necessary to have the jars completely immersed

during the boiling; the steam does the cooking. Put the top on the boiler and set it on the stove; bring to a boil and sterilize for one hour. Remove the top of the boiler, allow the steam to escape, and press down the spring at the side of the jar. This will clamp on the top and prevent any outside air from getting in.

In the vast majority of cases this one sterilization is all the treatment that is necessary, but it is not always safe to rely on it. During occasional years and in certain places some kinds of bacteria develop that can not be killed with one boiling. These sometimes break out in canning factories and cause a great deal of trouble. It is necessary to overcome this difficulty by giving the tomatoes two sterilizations instead of one. After the sterilization on the first day is complete, remove the jars from the vat and let them stand until the next day; then place them again in the vat as on the previous day, lifting the spring at the side of the jar in order to prevent the accumulation of steam on the inside, but do not take off the top. Boil again for one hour. Clamp on the tops by pressing down the springs and remove the jars from the vat.

This double or fractional sterilization is to be recommended upon all occasions. Follow these directions and allow no air to enter the jar during or after sterilization, and except in case of defective rubbers or broken jars you will seldom lose a can of tomatoes.

The same method may be followed in using screw-top jars. Put in the tomatoes, put on the rubber, and screw on the top lightly. Place in the boiler and boil for an hour. Screw on the tops tightly

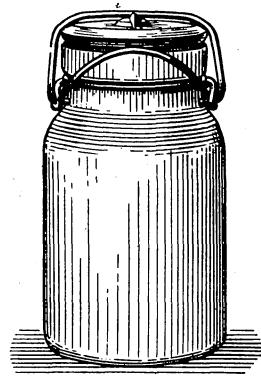


FIG. 1.—A glass-top jar used for canning tomatoes, showing the spring as adjusted during sterilization.

and remove from boiler. If you want to practice double sterilization with the screw-top jars, place them in the boiler on the second day and wait until the water comes to a boil before loosening the tops.

It is best with tomatoes, as with all other vegetables, to cook them in jars. Cooking first in an open kettle will drive off some of the volatile oils or other substances that give the tomatoes their flavor. This does not happen when they are cooked in the jar.

CANNING TOMATOES THICK.

For people who prefer their tomatoes thick, the following will be found a safe method:

Prepare them in the usual way, place in a preserving kettle, and boil till they reach the consistency desired. Pour them in the jars while hot, put on the tops loosely, and set the jars in the sterilizer, being careful to have the water already hot in order to prevent the jars from breaking. Bring to a boil, sterilize 20 minutes, fasten the cover on tightly, and remove the jars from the sterilizer.

CANNING WHOLE TOMATOES.

Remove the skins and cut up some tomatoes, put in a preserving kettle, and boil for 20 minutes. Remove them from the fire and run through a strainer. Return the strained liquid to the fire. Now select some small ripe tomatoes that will go into the mouth of the jar, dip them in boiling water, remove the skins, and drop the whole tomatoes into the jar. Fill the jar with these, add 1 level teaspoonful of salt to each quart, and pour in the strained liquid, still boiling, until all spaces are filled. Put on rubber and top, and place in the boiler or sterilizer on the false bottom. Have the water in the boiler already hot to keep the jars from breaking, bring to a boil, and sterilize for 30 minutes. Clamp on the top tightly and remove the jars from the boiler.

The strained tomato juice may be used for soup, and as the whole tomatoes will keep their shape they may be used for baking, bread-ing, etc.

STERILIZATION.

The rotting of the tomato, whether in the garden or in the jar, is due to the growth of forms of plant life called yeasts, molds, and bacteria, which are too small to be seen without a magnifying glass. They decompose the vegetable and form acids, carbonic-acid gas, and other useless compounds. The well-known swelling of cans of spoiled tomatoes is due to the formation of gas within them.

Of the three growths, the yeasts are the most easily handled, as they usually form no spores. Nearly all of the molds and many of

the bacteria, on the other hand, reproduce themselves by means of spores. These spores are but little heavier than air, so they float about and settle upon anything that is exposed. When they fall upon tomato pulp, for example, they germinate and the tiny plants begin to grow; these in turn reproduce themselves and in a short time an enormous number of little plants are busy decomposing the vegetable.

No forms of yeasts, molds, or bacteria can withstand the temperature of boiling water for any considerable length of time; therefore, boiling the tomato may kill the plants and arrest the growth, but unless the pulp is protected, a fresh supply of spores will soon find lodgment there and so the work of reproduction and destruction goes on. This is why the exclusion of air from canned vegetables and fruits is necessary. The air, if free from germ life, could be passed over a can of tomatoes for a long time without affecting them, but a bubble of air no larger than a pea, if not sterilized, may contain hundreds of spores. One of these spores is enough to cause the decomposition of a can of vegetables. Therefore, in order to keep a can of tomatoes it is necessary first to sterilize it so as to destroy all life in it and then to exclude the outside air.

Generally, bacteria do not develop in substances containing a high percentage of sugar, where yeasts and molds grow readily. This is why it is not necessary to seal preserves or jellies. A paper tied over the mouth of a jar or melted paraffin poured over the top of the fruit is sufficient to protect it from yeasts and floating mold spores. Neither do bacteria thrive in fruits or vegetables containing a large amount of acid. This is why rhubarb will keep without being sterilized. The tomato does not contain so much acid as rhubarb, yet its acidity is sufficient to prevent the growth of the more troublesome forms of bacteria. These bacteria develop spores that are more or less resistant to heat and are characteristic of such vegetables as corn or Lima beans. These vegetables must be boiled from three to five hours, or preferably may be boiled for one hour on each of three successive days, before they are perfectly sterilized.

While the spores of many bacteria will stand the temperature of boiling water for one hour without being killed, very few can stand that temperature for five hours. With the system of fractional sterilization, or heating upon three successive days, the first day's boiling kills all the bacteria, but does not kill the spores. The spores germinate over night and the boiling upon the second day kills this crop of bacteria before they have had time to develop resistant spores. Boiling on the third day is merely a matter of precaution, in order to be sure that sterilization is complete. It is absolutely necessary in either of these systems to prevent any outside air from entering

the jar, either during or after sterilization. This is explained in detail in Farmers' Bulletin 359, entitled "Canning Vegetables in the Home." If the sterilization is properly done and all germ life destroyed it is impossible for meats, fruits, or vegetables to decay.

DESCRIPTION OF THE STERILIZER.

In all methods of canning, some form of sterilizer will be found very convenient. To be able to do with the things she already has on hand is an important item to the housewife. Almost every housewife has a tin clothes boiler and this can be easily converted into a convenient sterilizing vat. The only things necessary are a tight-fitting cover and a false bottom, as is shown in figure 2.

The false bottom is absolutely necessary in order to prevent the jars from coming in contact with the bottom of the sterilizing vat, causing them to break during the boiling. For this purpose the writer uses an ordinary No. 16 wire netting of half-inch mesh, which is cut to fit the bottom of the boiler. If the netting is not available, thin pieces of wood or almost anything of this kind will answer the purpose. A patent open-door steam cooker is even more convenient than a clothes boiler. If neither of these is available, a deep saucepan or bucket tightly covered will answer the purpose.

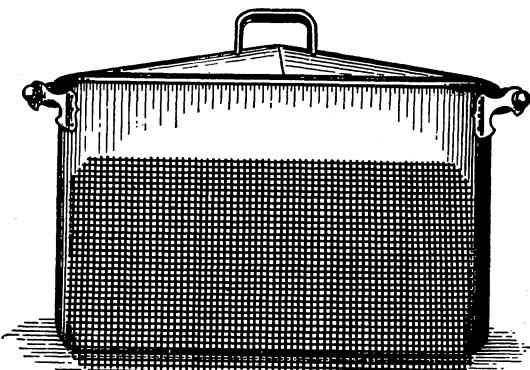


FIG. 2.—A tin wash boiler with a false bottom made of wire netting, used as a convenient sterilizer in canning.

KINDS OF CONTAINERS IN USE.

Whether canning for home use or for market, the first requisite is a good jar or can. In canning for home use the glass jars are undoubtedly the most economical. Aside from being less attractive, the tin cans will last only one year, while with good treatment the glass jars will last almost indefinitely. In canning for market, tin cans are usually more suitable than glass jars. Glass is more expensive and will not stand the handling necessary in transportation. However, many people prefer to have their tomatoes canned in glass and will be willing to pay a better price for them. The method of canning in tin will be taken up in another chapter.

In buying glass jars always select a good grade. The screw-top jar is more expensive in the long run than the more modern glass-top jars. The screw tops last only a few years and are hard to sterilize. A very good jar that the writer has had experience with is shown in figure 1 (p. 8). These jars have a glass top, wide mouth, and a smooth finish on the edges. This type is manufactured by many concerns and can be found under various trade names in almost any city. It sells at retail in Washington, D. C., for about \$8 a gross. There are many other styles of jars on the market, and while some may be more convenient or more durable than others, nearly all can be used to advantage.

In canning with glass jars, give particular attention to the rubber rings. These must be depended upon to exclude the outside air, with its bacteria and spores. While the writer buys the best grade of rubber rings and never uses one a second time, most of his failures may be traced to defective rubbers.

Examine every jar before buying it. Take up the top and run your finger around the edge. If the smallest crack or broken place is found, reject it.

USES OF TOMATOES.

Tomatoes can probably be prepared in a greater number of ways than any other vegetable. Few dinners are complete without them. They form the basis of most soups. They may be used in sauces for fish or oysters. As a vegetable they may be used in many ways. Lettuce and tomato salad with mayonnaise is one of the best dishes of its kind. The combinations with onions, peppers, cabbage, and spices represented by catchup, piccalilli, chowchow, and pickles are almost endless in number. It is scarcely to be wondered that the tomato has taken first place among the vegetables.

The writer, in addition to fruits and preserves, has this year canned 750 quarts of vegetables. Tomatoes alone or in combination entered largely into this supply. They were mixed with green cowpeas and canned for soup; they were mixed with okra and corn, or with okra alone, and used in this way either as a vegetable or in soup. Of this number not one jar spoiled, and when opened all had the delicate flavor characteristic of the fresh vegetable. Anyone can do equally as well. Select good materials and bear in mind the principles of sterilization, already explained. Sterilize on two, or even three, successive days those vegetables that are hard to keep. Allow plenty of time during the boiling for the interior of the jar to become thoroughly hot. Above all, use common sense.

RECIPES FOR TOMATOES.

TOMATO CATCHUP.

It is quite an art to make good catchup. The tomatoes should be of a red variety and thoroughly ripe. They should be gone over carefully, and those having rotten spots or green places should be discarded. The boiling should be done as rapidly as possible in enameled, aluminum, or porcelain-lined preserving kettles. Long boiling has a tendency to darken the product. With the exception of cayenne pepper, which should be ground, whole spices should be used whenever possible. Ground spices darken the catchup.

Recipe No. 1.

Wash and cut up a quantity of tomatoes. It is not necessary to remove the skins. Put in kettle without any water and boil until thoroughly soft. Mash through a fine sieve until only seeds and skins remain. To each gallon of this liquid add 3 level tablespoonfuls of salt and one-fourth tablespoonful of red pepper. Place again in the kettle and suspend in it a little flannel bag containing, for each gallon—

2 level tablespoonfuls of whole all-spice.	2 level tablespoonfuls of unground celery seed.
4 level tablespoonfuls of unground white or yellow mustard seed.	1 ounce of stick cinnamon.
1 level tablespoonful of whole cloves.	3 ounces of green ginger root that has been cleaned and scraped.

Now drop in two large whole onions. Bring to a boil, stirring frequently to prevent scorching, and boil until the mixture begins to thicken; then add 1 pint of vinegar and 3 level tablespoonfuls of sugar. Continue boiling until the catchup becomes so thick that when a teaspoonful is removed and placed in a saucer no water will run from it. Remove the onions and the bag containing the spices, put the catchup into jars or bottles that have been previously washed in boiling water, and seal or cork while hot. If kept corked, catchup made in this way will keep indefinitely.

We are indebted to Mrs. H. E. Doyle, Washington, D. C., for this recipe.

Recipe No. 2.

The following recipe has been used by the writer with very good success: Take 1 peck of red, ripe tomatoes, clean them, put them in a preserving kettle, and cook until thoroughly done. Mash them through a fine strainer to remove the seeds and skins. Add to this 8 level tablespoonfuls of salt and 1 level tablespoonful of cayenne pepper. Suspend in the tomatoes a flannel bag containing—

2 level tablespoonfuls of black pepper.	1 level tablespoonful of unground all-spice.
6 level tablespoonfuls of mustard.	
1 level tablespoonful of cinnamon.	1 level tablespoonful of cloves.

Boil as rapidly as possible until the catchup begins to thicken; then add 1 quart of vinegar and continue boiling until a teaspoonful placed in a saucer will not give off any water. Remove the bag containing the spices, put the catchup in jars or bottles, and seal or cork while hot. If paraffin is convenient, melt a small quantity in a saucepan, invert the bottle of catchup and dip the cork and upper part of the bottle neck in it. The paraffin will help to keep out mold spores.

CHILI SAUCE.**Recipe No. 1.**

Scald and peel sound, ripe, red tomatoes. Chop into small pieces by pressing through a half-inch screen or by running through a coarse meat chopper—

36 pounds of tomatoes.

2 pounds of chopped onions.

10 ounces of ripe bullnose peppers
(after stems and seeds have been removed).

The bullnose peppers should be hot enough to give the proper flavor to the sauce. In case they are too mild, a small amount of cayenne should be added. A pound of the large sweet, or Chinese, peppers, if they can be had, will also add richness and color. Put into a granite-ware or enameled kettle and concentrate to 18 pounds. Because of the tendency to settle on the bottom of the kettle and burn, it is a good plan to allow the tomatoes to stand for a few minutes after chopping, during which time considerable juice will separate out. This can be poured off and placed in the kettle and concentrated before the rest of the above ingredients are added. After concentrating to 18 pounds, add 2½ pounds of cider vinegar and 9 ounces of salt.

Concentrate further to 18½ pounds and add 6 pounds of sugar. Boil slowly 5 to 10 minutes. Put into jars that have been washed in boiling water and seal while hot. The above quantity will yield about 23 pounds, or sufficient to fill 18 to 20 pint jars.

Throughout the boiling care must be exercised by stirring to keep the ingredients from settling to the bottom and burning. This is especially necessary after the sugar is added. In order to weigh the contents of the kettle at different stages in the process of concentrating, the weight of the empty kettle should be noted at the start. The kettle, with its contents, can then be set on the scales or hung on the balance from time to time without inconvenience, and the weight of the contents easily determined. This sauce is not likely to mold; but, as a precaution against spoiling, it is advisable—after filling the jars and putting on the rubbers and tops—to place them in the clothes boiler and sterilize them for about 30 minutes. If this sauce is properly made it will have a bright red color and a rather mild and sweet taste. It is delicious when served with meats, oysters, baked beans, etc.

We are indebted to Dr. B. J. Howard, Bureau of Chemistry, for this recipe.

Recipe No. 2.

For those wishing a sauce not quite so sweet, but more on the order of a pickle, the following recipe will be found satisfactory: Scald and peel 24 ripe tomatoes; chop these up with 2 red bullnose peppers, 2 green bullnose peppers, and 2 large onions. Put into an enameled saucepan and add—

4 cups of vinegar.	2 level teaspoonfuls of whole cloves.
1½ cups of brown sugar.	2 level teaspoonfuls of cinnamon.
2 level tablespoonfuls of salt.	2 level teaspoonfuls of ground ginger.
2 level teaspoonfuls of whole allspice.	2 level teaspoonfuls of ground nutmeg.

Bring to a boil, stirring frequently to prevent scorching, and boil until the sauce begins to thicken. The onions will then be well done. This should not take over an hour. Remove the vessel from the stove, put the sauce into jars, and seal while hot. This will keep in a wide-mouthed bottle if it is well corked and dipped in paraffin.

We are indebted to Mrs. P. H. Smyth, Falls Church, Va., for this recipe.

CHOWCHOW.**Recipe No. 1.**

Chop fine with a knife or run through a coarse food chopper—

$\frac{1}{2}$ peck of green tomatoes.	3 cucumbers.
$\frac{1}{2}$ peck of small onions.	6 large red peppers.
3 cauliflower.	$\frac{1}{4}$ peck of yellow string beans.

Place in a brine made by dissolving 1 pound of salt in 5 pints of water and let set over night. In the morning bring the brine, with the vegetables still in it, to a boil and keep boiling a few minutes.

In a separate vessel bring 1 gallon of cider vinegar to a boil. With a little water make a paste of—

$\frac{1}{2}$ pound of ground mustard.	1 cup of brown sugar.
$\frac{1}{2}$ ounce of turmeric.	2 level tablespoonfuls of flour.

Put this paste, with a half ounce of celery seed, in the vinegar and boil until it begins to thicken. Now take the vegetables up, drain off the brine, put the vegetables in another saucepan, and pour the boiling vinegar mixture over them. Mix well, put in jars, and seal while hot. This chowchow is best when about the consistency of thick cream. If very much water is left in the vegetables in the form of brine it will be too thin. In this case use more flour and thicken it. Instead of the cauliflower an equal part of celery or cabbage may be substituted.

We are indebted to Miss Helen Boyd, Washington, D. C., for this recipe.

Recipe No. 2.

Chop up—

2 quarts of green tomatoes.	1 small head of cabbage.
12 small cucumbers.	6 onions.
4 green peppers.	1 quart of string beans.

Mix well and put in a stone jar or enameled pan. Put in a layer of vegetables and sprinkle well with salt. Continue this until all the vegetables are used up, covering the last layer well with salt. Let stand over night and drain. In a separate vessel put—

1 gallon of vinegar.	1 level tablespoonful of black pepper.
1 level tablespoonful of celery seed.	1 level tablespoonful of cloves.
1 level tablespoonful of mustard.	1 cup of salt.
1 level tablespoonful of allspice.	

Heat to boiling, add the chopped vegetables, and cook until tender. Put into jars and seal while hot.

We are indebted to Miss Carrie Belle Hyde, Winthrop College, Rock Hill, S. C., for this recipe.

TOMATO RELISH.

Scald and skin 15 ripe tomatoes. Pare, core, and cut into small pieces 6 sour apples. Peel 5 medium-sized onions. Chop all of these very fine, using a food chopper if you have one. Put into a large saucepan with—

2 level tablespoonfuls of salt.	$\frac{1}{2}$ teaspoonful of cayenne pepper.
3 green peppers or 1 level teaspoonful of black pepper.	$\frac{1}{2}$ pint of vinegar.

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Bring to a boil and boil slowly $1\frac{1}{2}$ hours. Remove the vessel from the stove, put the relish into jars or bottles, and seal while hot. This is mild and delicious when served with meats, oysters, or vegetables.

We are indebted to Mrs. F. B. Headley, of Fallon, Nev., for this recipe.

CHOPPED PICKLE.

Recipe No. 1.

Chop up—

1 gallon of green tomatoes.	24 large green peppers.
1 gallon of cabbage.	12 large red peppers.
$\frac{1}{2}$ gallon of onions.	

Put all together in a vessel, cover with water, add about 1 pint of salt, and let stand over night. In the morning put all in a bag and drain 24 hours. After draining add 1 pint of white mustard seed. In a separate vessel boil 1 gallon of vinegar with $1\frac{1}{2}$ pounds of brown sugar. When boiling hot, pour over the chopped vegetables. Put all on the stove together and cook about 15 minutes. Put in jars and seal while hot.

Recipe No. 2.

Chop up 1 gallon of green tomatoes, 2 gallons of cabbage, and 12 medium-sized onions.

If any juice runs out of the tomatoes, pour it off. Mix these together and add enough vinegar to make about 1 quart of juice. Then add—

1 $\frac{1}{2}$ pounds of sugar.	2 level tablespoonfuls of celery seed.
$\frac{1}{2}$ pound of white mustard seed.	2 level tablespoonfuls of black pepper.
8 level tablespoonfuls of salt.	$\frac{1}{2}$ ounce of turmeric.

Put all in an enameled kettle and suspend in it a bag containing 2 level tablespoonfuls of whole cloves and 2 level tablespoonfuls of whole allspice. Boil for about 20 minutes. Put into jars and seal while hot.

We are indebted to Mrs. L. H. Bailey, Washington, D. C., for this recipe.

GREEN-TOMATO PICKLE.

Recipe No. 1.

Prepare 4 quarts of green tomatoes, 4 small onions, and 4 green peppers.

Chop fine, put into enameled pan, sprinkle well with salt, and let stand over night. In the morning drain off the brine from the vegetables. In a separate vessel put—

$\frac{1}{2}$ quart of vinegar.	1 level tablespoonful of cloves.
1 level tablespoonful of black pepper.	1 level tablespoonful of allspice.
1 level tablespoonful of mustard seed.	1 level tablespoonful of cinnamon.
1 level tablespoonful of celery seed.	$\frac{1}{2}$ cup of salt.

Bring to a boil and add vegetables. Cook 20 minutes after the pickle begins to boil. Fill jars and seal while hot.

We are indebted to Miss Carrie Belle Hyde, Winthrop College, Rock Hill, S. C., for this recipe.

Recipe No. 2.

Wash and slice without peeling 1 peck of green tomatoes. Put these into a wide-mouthed jar in layers, sprinkling each layer well with salt. Let stand over night. In the morning drain off all the liquid.

Prepare some spiced vinegar by taking 1 quart of vinegar, putting it into a saucepan, and suspending in it a bag containing 1 level tablespoonful of whole cloves, 1 level tablespoonful of whole allspice, and 1 level tablespoonful of stick cinnamon.

Bring to a boil and boil one-half hour. Chop up 24 medium-sized onions and 6 red bullnose peppers.

In a larger porcelain kettle place a layer of the sliced tomatoes; then a layer of onions. Sprinkle with black pepper and add some of the chopped red peppers. Pour over this some of the spiced vinegar and continue this until all the material is used up. Press the mixture down and cover with vinegar. Cook until tender but not too soft. Empty into a jar and cover well. This will not spoil if kept in a cool place.

A cup of brown sugar added to this will make a sweet tomato pickle.

We are indebted to Mrs. P. H. Smyth, Falls Church, Va., for this recipe.

TOMATO SWEET PICKLE.

Take 1 peck of green tomatoes and 6 large onions. Slice, sprinkle 1 cup of salt over them, and let stand over night. In the morning drain, add 2 quarts of water and 1 quart of vinegar, boil 15 minutes, then drain again and throw away this vinegar and water. Add to the tomatoes and onions—

2 pounds of sugar.	2 level tablespoonfuls of ginger.
2 quarts of vinegar.	2 level tablespoonfuls of mustard.
2 level tablespoonfuls of cloves.	2 level tablespoonfuls of cinnamon.
2 level tablespoonfuls of allspice.	1 teaspoonful of cayenne.

Boil for 15 minutes. The allspice and cloves should be tied up in a piece of thin cloth, which should be removed when through cooking. It is best to transfer all pickles, preserves, etc., to jars and seal while hot. However, this pickle will keep without being sealed.

PICCALILLI.**Recipe No. 1.**

Chop up 1 peck of green tomatoes and 8 large onions.

Add 1 cup of salt, mix well, and let stand over night. In the morning drain thoroughly and add 2 quarts of water and 1 quart of vinegar.

Boil for 20 minutes and drain through a sieve. Put the vegetables back into the enameled kettle and add—

2 quarts of vinegar.	1 level tablespoonful of ground ginger.
1 pound of sugar.	1 level tablespoonful of whole allspice.
½ pound of white mustard seed.	1 level tablespoonful of whole cloves.
2 level tablespoonfuls of ground black pepper.	½ level teaspoonful of ground cayenne pepper.
2 level tablespoonfuls of ground cinnamon.	

Boil all together for 15 minutes or until the vegetables are tender, stirring often to prevent scorching. Put into jars and seal while hot.

We are indebted to Mrs. P. H. Smyth, Falls Church, Va., for this recipe.

Recipe No. 2.

Slice up 1 peck of green tomatoes and 2 quarts of onions.

Place the tomatoes and onions in a colander in alternate layers and sprinkle each layer with salt. Let these drain all night. In the morning put into an enameled kettle with—

4 level tablespoonfuls of whole allspice. | 5 red bullnose peppers.

4 level tablespoonfuls of whole cloves. | 2 cups of sugar.

4 level tablespoonfuls of cinnamon bark.

Press down into the kettle and add enough vinegar to cover. Cook until tender. Put into jars and seal while hot.

PRESERVED TOMATOES.

Use either the yellow or red, pear or cherry varieties. Other kinds may be used, but these grow abundantly and make a much more attractive preserve. Take the ripe tomatoes and immerse them, a few at a time, in boiling water for a few minutes only. Remove the skins carefully so as not to break the tomatoes. Weigh them and put into a preserving kettle with as many pounds of granulated sugar as you have of tomatoes.

Prepare green ginger root by carefully scraping off all the skin and shaving it into small bits. Add 1 level teaspoonful of these ginger shavings for each 2 pounds of tomatoes.

Let the contents of the kettle come to a boil and boil for 10 minutes. Remove the tomatoes from the sirup and spread them upon a flat dish to cool. This will keep them from coming to pieces. When cool return them to the boiling sirup and boil gently until they are the desired thickness. Put into jars while hot, adding a slice of lemon to each jar before sealing.

TOMATO MINCEMEAT.

Slice up a quantity of green tomatoes and sprinkle well with salt. Put into a bag and hang up to drip all night. The salt which is left on the tomatoes will not need washing off. In the morning take equal weights of sugar and tomatoes and cook until the tomatoes are thoroughly done. To 7 pounds of the mixture of tomatoes and sugar add 3 pounds of seedless raisins, with mace and cinnamon to suit the taste. Cook a short time after adding the seasoning and put into jars. This will keep without being sealed and will make delicious pies, which many consider as good as those from ordinary mincemeat.

II.—CANNING TOMATOES IN CLUBS AND FOR MARKET.

By O. H. BENSON,

Specialist in Charge of Club Work, Office of Farm Management, Bureau of Plant Industry.

INTRODUCTION.

The principles of sterilization are always the same, whether applied to tomatoes canned in glass for the home or in tin for the market. It is absolutely necessary in either case to have the product completely sterilized and to exclude the outside air.

Canning for market differs from home canning only in minor details in which economy of time and labor is to be considered. Except in the case of a very select trade it is usually more economical to use tin cans. The first cost of these is less than glass and they can be readily handled and shipped without danger of being broken.

During the early part of the season the demand for fresh tomatoes and the high price they bring make it usually more profitable to sell the first crop and to can the main or last crops. The best varieties for canning are the Acme, Beauty, and Stone. This is because of their shape, their firmness, and their bright-red color. The market demands a red tomato.

PORABLE HOME CANNING OUTFITS.

Canning tomatoes for market on an extensive scale necessitates the use of labor-saving machinery. During the last few years the manufacturers have foreseen this need and have developed a great many kinds of canning outfits that may be used on the farm and in the school and answer every purpose of a commercial canner. These range in price from \$5 to \$15. A book of instructions accompanies each of these outfits and with these directions and the suggestions contained in this bulletin a failure will be unlikely.

Commercial canning outfits are divided into two general classes: (1) The factory equipment, constructed in many different sizes, designed for stationary work in factories and for the purpose of han-

dling large quantities of products within a very short period of time, and (2) the portable, or home cannning outfit, constructed so as to make them convenient for the work of canning the surplus products of orchard and garden of the country or village home. It is a lamentable fact that over 50 per cent of the natural production of the average orchard and garden has not only been wasted, but is actually lost for food products to American homes for want of some simple way of taking care of the surplus products.

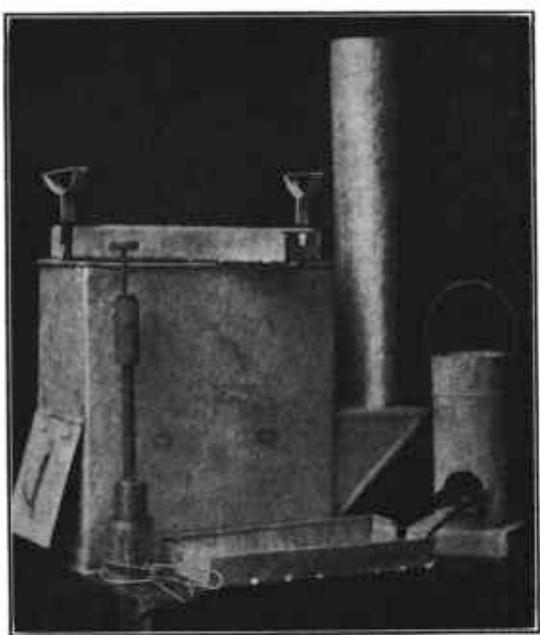


FIG. 3.—A small portable hot-water canner and fixtures.

The little portable canners encourage more and better canning at home, as all the members of the family take an interest in the work and offer their assistance; the work is done out of doors and thus relieves the busy housewife from cleaning up the "muss" at the close of each canning experience, and it gives the operators fresh air and the freedom necessary for good work instead of the heat and confinement of the kitchen. The aim of this bulletin is to show how easy it is to save the surplus products, to encourage more gardening, and to make it easy to can a larger quantity of fruits and vegetables for both home and market. Most women and girls need the "pin money" made possible by this canning work.



FIG. 4.—A combined hot-water and steam canner; self-seal top.

Every well-regulated farm should have a home canner of some description. It is quite as important as the milk separator, fanning mill, or corn harvester, and it is possible to make your own device, as suggested in this bulletin. Every child should be taught the art of canning, either at home or in the canning clubs, and every school should have a canning outfit as part of its equipment.

The portable canners are of three distinct kinds: (*a*) Hot water with open boiler; (*b*) hot water and steam combination, with close-fitting cover; and (*c*) steam-pressure outfits.

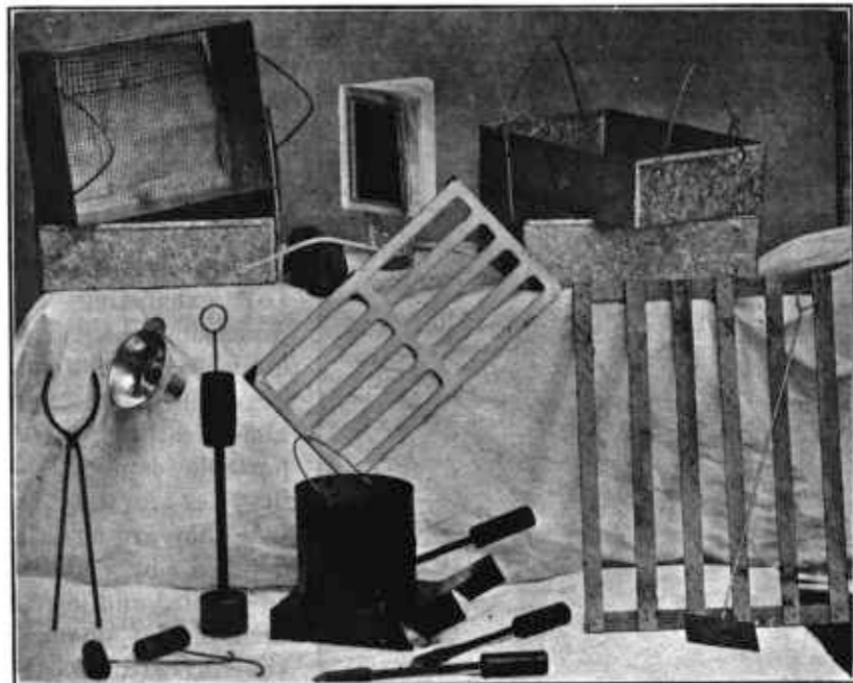


FIG. 5.—Necessary fixtures for a combined hot-water and steam canner.

The home canners should have the following parts, utensils, and equipment in order to be complete and ready for use without additional purchases:

Hot-water outfit.—Boiler, inside crates or blanching trays, fire box, smoke pipe to fit outfit, one or two circular capping steels, two tipping coppers, one pair of can lifters, one fruit filler, one pair of tray lifters, one lattice bottom of wood or a screen for the boiler or sterilizer (for homemade outfits), one sponge, one small brush, a wood or coal grate for the fire pot, an ash rake, and sandpaper. In addition, some of the manufacturers furnish the sal ammoniac and a bottle of muriatic acid needed in connection with sealing the tin containers. (Figs. 3, 4, and 5.)

Steam-pressure outfit.—The requirements are the same as for hot-water outfits, with the addition of a steam gauge and thermometer. In some cases a blast furnace is supplied with the soldering tools. (Figs. 6 and 7.)

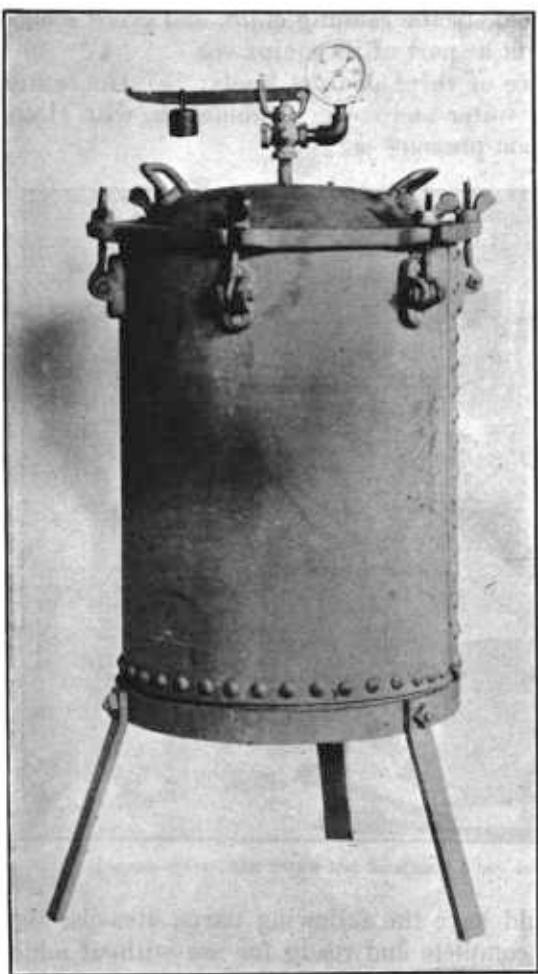


FIG. 6.—A steam-pressure canner.

Outfits similar to those described and illustrated are on the market and cost from \$3 to \$15. Some include a boiler, a crate, a soldering outfit, and arrangements for a fire pot.

Usually instruction books are furnished with every outfit, giving simple rules for its use and a table for exhausting and processing the various kinds of fruits and vegetables. A valuable feature of the portable canning outfits lies in the fact that they are as easily handled by children as adults, and can be used out of doors, in the orchard, garden, or back yard, and thus relieve the housewife of the trouble of the cleaning up incident to a day's work in canning.

Select the outfit which seems to fit your needs best; if possible, see it in operation before buying.

USING THE HOME CANNERS.

In canning it is absolutely essential that a definite program be followed. This gives precision to the work and eliminates many mistakes that would otherwise occur. The program given here has

been found by experience to be very satisfactory. Study this program carefully before proceeding, and be sure to have all the articles listed on page 24 arranged conveniently at hand ready for use.

PROGRAM FOR CANNING TOMATOES AT HOME.

- (1) Prepare the canning outfit, tables, fruit, water, fuel, salt, sugar, utensils, etc., ready for use.
- (2) Scald the tin containers and fruit jars and start the work of heating and tinning the capping steels.
- (3) Scald the tomatoes in boiling water and remove skins and cores. Remove the skins at once. The scalding process is important and should be rapid, thorough and complete. Chill in cold water.
- (4) Fill the cans or jars to within one-fourth inch of the top; add tomato juice (*not water*) and salt and then solder the caps on the cans. Invert the cans in trays and allow them to drain through the ventholes. Weigh them as required by the Pure Food and Drugs Act as applied to the size of can and kind of fruit used.
- (5) Exhaust the cans in boiling water 5 to 8 minutes, according to the condition of the fruit.
- (6) Remove the cans and finish the capping by closing the venthole in the tin cap.
- (7) Return the cans to the boiler and sterilize or process for 15 to 30 minutes, according to the condition of the fruit and the kind of canner used.
- (8) Remove the cans. Inspect them carefully to see whether all are air tight. Let cool before you label.
- (9) Label, grade, number, and tier, or pack for shipment. Enter number, cost, etc., in your book account.



FIG. 7.—Soldering tools necessary for a complete steam-pressure outfit.

DEFINITIONS OF CANNING TERMS.

The following definitions will enable the beginner to know the ordinary terms used in canning:

Scalding.—To dip fruit in boiling hot water in order to remove the skin.

Blanching.—To boil quickly in water by placing the vegetables in a cloth bag, which is to be lowered entirely under water. This is done in order to eliminate acids and bitter substances from the fruit or vegetables.

Exhausting.—(Sometimes called "parboiling"). To boil fruit or vegetables for a few minutes in order to drive out of the fruit and container all gases and surplus air and permit expansion before sealing the venthole. Exhausting is not practiced by all canners, but the writer considers it important, and safer with the many kinds and qualities of fruit and vegetables canned, especially when using the hot-water bath outfits at home.

Exhausting causes most fruit to shrink, but swells corn and some vegetables.

Sterilizing.—To boil fruit or vegetables for a certain period after the container has been completely sealed. This is sometimes called "processing" or "boiling."

Tinning the steel.—To put the hot steel used for capping cans in sal ammoniac and solder, turning the steel several times until smooth and bright, and then dipping it in soldering "flux."

Capping.—Soldering the little solder-hemmed tops on the cans with the capping steel.

Tipping.—Closing or sealing the little air hole or vent in the center of the tin cap, just between the exhaust and sterilization periods.

Processing.—(Used for "sterilization," "cooking," or "boiling.") These expressions all mean the same thing.) To completely destroy all bacteria, spores, germs, etc., in hermetically sealed cans and packages by hot water, steam, or steam pressure.

Flux.—Soldering flux is prepared by adding to muriatic acid as much zinc as will be dissolved, and then adding water equal in amount to the acid. This fluid is used to clean your steel and for wiping all surfaces to be soldered. By the addition of zinc to the acid, zinc chlorid is formed, and this when applied to the tin adds a coating of zinc, to which the solder will readily adhere.

The flux should be applied carefully and none of it allowed to get inside of the can.

The solder will not adhere to tin without this flux or a similar substitute, such as rosin.

A commercial flux can be secured at a drug store.

Look up the meaning of the following terms in the dictionary: Bacteria, yeast, molds, spores, ferment, germs, and microbes.

A FEW ESSENTIALS FOR SUCCESSFUL CANNING.

In addition to the canning outfit, the following are essential for efficient work:

- (1) A clock in a convenient position where all can see it, and scales graduated from 1 ounce to 24 pounds.
- (2) A record book in which all records are kept for the use of the club member, school, or housewife. If pupils constitute a class, then each pupil should have a record book and pencil.
- (3) Plenty of clean wiping cloths for wiping cans, coppers, and steels.
- (4) Salt, sugar, and plenty of clean, pure water.
- (5) A sharp paring knife for each person working; tables, tins, pans or containers, buckets, etc., enough for convenient and efficient work.
- (6) The necessary glass jars or a supply of tin cans with solder-hemmed caps and the labels.
- (7) Either commercial or homemade soldering flux.
- (8) Last, but not least, a leader or manager of the canning party, in case the work is done from the standpoint of the school or a class in canning. This

leader should have the program well in hand so as to arrange for the proper division of labor and at the same time permit every member to make her experience complete, from the preparation of the fruit and sterilization of utensils to the labeling of can or jar.

In canning tomatoes it is always advisable to classify your fruit in the following divisions: Extra fine, fine, medium, and small. This grading is for convenience in selling. It is well to impress upon the canners the importance of the different sizes of containers; small containers require less time than large ones. A pint can under 15 pounds steam pressure requires about 6 minutes, and if under 5 pounds, 15 to 20 minutes. A quart container under 15 pounds of steam requires 8 to 12 minutes, and under 5 pounds of steam 25 minutes.

SUGGESTIONS FOR HOME AND CLUB CANNING.

(1) Anyone with ordinary intelligence can make a success of canning tomatoes at home by exercising care in following the instructions given in this bulletin. Common sense, good judgment, and experience will make for success in every way. One's individuality is quite as important as rules and formulas.

(2) All fruits, vegetables, juices, meats, and foodstuffs must be completely sterilized and kept in air-tight containers. Insist upon sanitation. The decay and spoiling of fruit and foodstuffs is due to bacteria, spores, ferment germs, etc. Sterilize and cleanse all containers, vegetables, and fruit before proceeding with the work.

(3) Open boilers are less desirable than the closed boiler or steam-pressure outfits, as the heat of the water in them can not exceed 212° F., and the fruit jars must be kept completely covered with the water, thus requiring more time and labor than with the closed outfits.

(4) The hot-water canners with close-fitting covers on the boilers do successful work with ordinary fruits and some vegetables. They operate with little water and much of the sterilizing is done with live steam in the upper section of the boiler. Some of these boilers carry heat from 212° to 216° F.

(5) Steam-pressure canners are the most successful for canning all kinds of vegetables and meats, because the greater heat and pressure effect complete sterilization. Steam under pressure raises the heat to about 250° F. and readily destroys all bacteria and spores in fruit and vegetables. From 5 to 15 pounds pressure to the square inch is used in successful canning work.

(6) Use only fresh fruit and vegetables, and always can fruit the same day it is picked.

(7) Tomatoes should first be dipped in boiling water, then chilled in cold water to make them firmer. They will also pack better.

(8) Let the water come to the boiling point before you lower the fruit into the boiler. Begin to count time for sterilization when the fruit enters the boiling water.

(8) Let the water come to the boiling point before you lower the likely to cause the product to spoil. Different varieties and different degrees of ripeness require variation in the length of time given to processing. Soft fruit requires longer boiling than sound fruit. Overripe tomatoes will need to process a few moments longer than if they were just ripened, firm, and sound.

(10) Some vegetables contain acids that must be destroyed or eliminated before final processing and sealing. This is usually done by blanching or boiling the vegetables in a weak brine before filling the cans.

(11) Differences in climate, soil, and fertilizer make changes in the chemical and physical properties of tomatoes and affect slightly the time required for sterilization.

USEFUL TABLES FOR THE CANNER.

CANS.

The pure-food law requires a minimum weight of 32 ounces of tomatoes for No. 3 cans and 22 ounces for No. 2 cans.

When filled invert cans in tray and allow them to drain; then fill them with tomato juice. Do not fill with water.

1 bushel of tomatoes will fill 18 No. 3 cans.

1 bushel of tomatoes will fill 24 No. 2 cans.

1,000 No. 1 tin cans will cost about \$10.

1,000 No. 2 tin cans will cost about \$14.

1,000 No. 3 tin cans will cost about \$16.

1,000 No. 10 tin cans will cost about \$18.

Three and four color labels cost from \$1 to \$2 per 1,000.

Solder-hemmed caps cost from \$1.25 to \$1.50 per 1,000.

The average freight car will hold about 85,000 No. 2 cans, or 55,000 No. 3 cans, not cased.

When shipped in cases the average freight car will hold about 43,000 No. 2 cans and 30,000 No. 3 cans.

1,000 No. 2 empty cans will weigh about 212 pounds.

1,000 No. 3 empty cans will weigh about 310 pounds.

1 case of 24 No. 2 empty cans will weigh about 13 pounds.

1 case of 24 No. 3 empty cans will weigh about 17 pounds.

BRINE.

Ordinary brine is made by dissolving one-half quart of salt in 25 quarts of water. By dissolving 1 quart of salt in $12\frac{1}{2}$ gallons of water the percentage of salt in the brine is 1 per cent in 1 pound, 2 per cent in 2 pounds, etc.

STEAM PRESSURE.

Comparative gauge of steam pressures.

Pressure per square inch.	Temper- ature.	Pressure per square inch.	Temper- ature.
1 pound.....	° F. 216	7 pounds.....	° F. 233
3 pounds.....	222	10 pounds.....	240
5 pounds.....	228	12 pounds.....	244

PROCESSING.

In regular commercial canning the exhaust method is not always used. The cans are usually packed with cold tomatoes and sealed completely, then sterilized, without exhaust, according to the following table:

No. 2 cans, 12 minutes at 240° F.	No. 3 cans, 40 minutes at 212° F.
No. 2 cans, 35 minutes at 212° F.	Gallon cans, 30 minutes at 240° F.
No. 3 cans, 15 minutes at 240° F.	Gallon cans, 75 minutes at 212° F.

Hot-packed tomatoes, without exhaust, are processed commercially as follows:

No. 2 cans, 8 minutes at 212° F.	Gallon cans, 15 minutes at 212° F.
No. 3 cans, 10 minutes at 212° F.	

With exhaust, use 240° instead of 212° F., adding 5 or 10 minutes to the time required for gallon cans.

SIRUPS.

Sirups for use in canning are made by boiling granulated sugar with pure water at 212° F. All the impurities which rise to the top should be carefully removed with a spoon or ladle until the sirup appears clear and transparent. If the fruit is properly sterilized the sirup will not add anything to the keeping qualities. The density of the sirup should be determined largely by the taste.

Western growers usually make their fruit sirups on the basis of 1½ pints of sugar to 1 pint of water, while many in the East use 1 pint of sugar to 1½ pints of water. This accounts in a large measure for the greater popularity of the western canned fruits.

- 1 pint of sugar to 1 gill of water makes a sirup of 40° density.
- 1 pint of sugar to ½ pint of water makes a sirup of 32° density.
- 1 pint of sugar to 1 pint of water makes a sirup of 24° density.
- 1 pint of sugar to 1½ pints of water makes a sirup of 17° density.
- 1 pint of sugar to 2 pints of water makes a sirup of 14° density.

For preserving cherries, strawberries, etc., a sirup of 40° density is used. For preserving currants, peaches, plums, quinces, etc., a sirup of 24° to 32° density is used.

For canning blackberries, blueberries, cherries, peaches, pears, plums, and raspberries a sirup of 14° to 17° density is used.

SOME POSSIBILITIES OF THE CANNING WORK.¹

Home and club canning work has great educational possibilities if properly correlated with the work of the public schools. Figure 8 shows a canning-demonstration event in a typical rural school in Pike County, Ala.

Canning may be carried on by the teacher or demonstrator in such a way as to furnish practical object lessons of productive as well as constructive work. Plans can be made in the spring at planting



FIG. 8.—A canning demonstration held in the Bon Air School, Pike County, Ala.

time and when the school opens in the fall the anticipation of such a special event as this will attract the attention of the students at the start and give them work in which they are directly interested.

Figures 9 and 10 show groups of girls about to take part in canning demonstrations out of doors.

The following canning demonstration program will serve as a guide for the teacher or demonstrator in conducting this work, but it should not be undertaken without a careful study of the details given under "Using the home canners," page 22.

¹ Prepared in cooperation with Mr. D. J. Crosby, specialist in agricultural education, Office of Experiment Stations.

PROGRAM FOR A CLUB OR SCHOOL CANNING DEMONSTRATION.

(1) Select a convenient period for the canning demonstration and plan all features of the work in advance. The club leader or teacher who conducts the canning exercises should herself be as familiar as possible with all the processes involved, so as to direct the work in such a manner as to insure its success.

(2) Before school opens, place and arrange the canning outfit, tables, supplies, water, fruit, and clock; start the fire and heat the steel and capping irons.



FIG. 9.—Schoolgirls assembled for a canning demonstration, Union School, Pike County, Ala.

(3) Call the club members to order, announcing to them the special exercises of the day, and then write on the blackboard a complete list of the articles making up the canning outfit and supplies. At the same time have the club members copy this list in their notebooks. (Note here the opportunity for spelling and word study.)

(4) Explain the meaning of sterilization and describe the operation of the home canning machine; define "bacteria," "spores," "germs," "exhaust," "flux," and other unfamiliar terms; explain the requirements of the pure-food law as it applies to canned goods, especially tomatoes; emphasize the importance of meeting weight requirements and of grading and labeling cans according to quality;

emphasize the following quotation from the decision of the Board of Food and Drug Inspection:

* * * The board holds that canned tomatoes should contain no added water. The tomatoes employed should be thoroughly ripe, should be well washed before peeling, should be peeled in a sanitary manner and the cans filled, sealed, and processed without the addition of any water.

(5) Having completed the preliminary instructions, assign each club member some duty in the canning demonstration, being careful to have every member of the class take part in the work. By changing them about from time to time it will be possible for each pupil to go through all the processes of canning, from the preparation of con-

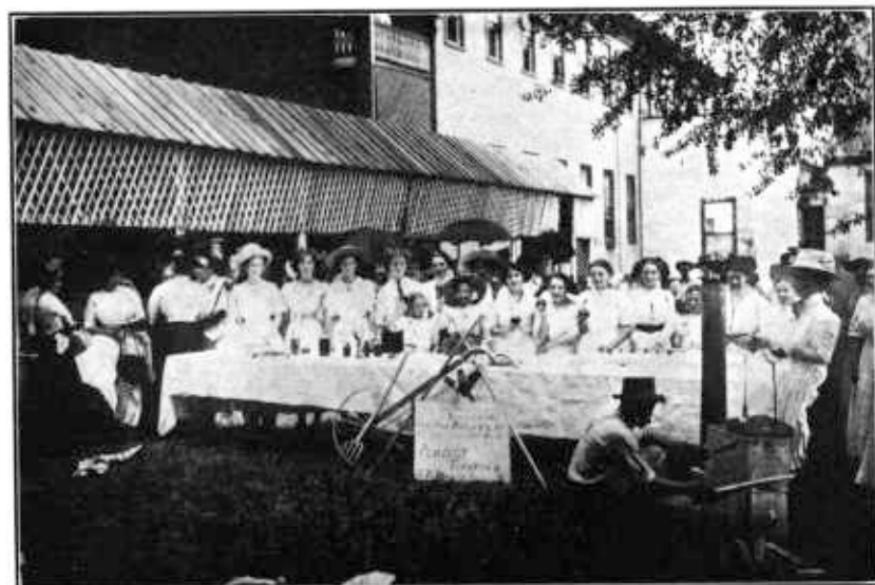


FIG. 10.—Girls ready for a home canning demonstration under the trees in a back yard in Mississippi.

ainers and fruit to the labeling of cans and the entering of complete records for future reference. Be sure that each one knows by experience how to scald tomatoes, fill cans, invert and drain them, weigh them, tin the steel, cap, exhaust, close air holes, sterilize, and label.

(6) The cleaning-up process and the putting away of outfit, utensils, and canned products should also be done by the club members.

(7) Later in the club work, when the girls have gained some experience, conduct contests in canning to see who can put up the largest number of No. 2 or No. 3 cans in one hour. It will also be well to have team contests between different clubs; contests in scalding and paring and in the filling of cans; and tomato judging. A can-labeling contest would be equally interesting.

(8) An appropriate time for a review of "How to can tomatoes" is at the close of the canning season, since the club members will then better appreciate the instructions given. In this connection a contest can be held in giving the best oral or written statement on "How to can 24 No. 3 cans of tomatoes." At all times when canning is under consideration, either in the demonstrations and contests or in the study of literature relating to canning, attention should be given to the correlation of this work with the regular school work in writing, language, spelling, geography, and agriculture. Many practical problems for the arithmetic class can be taken from garden and canning experiences. A club leader or teacher with a fair degree of originality will have no trouble along these lines.

As one of the features of correlation, let each girl write an illustrated booklet on "How I raised and canned my crop of tomatoes," as suggested by the following outline:

SUGGESTIONS FOR AN ILLUSTRATED BOOKLET ON TOMATO CULTURE AND CANNING.

Use a good grade of drawing paper, about 9 by 11 inches.

Make a cover design to indicate in a neat and attractive manner just what is within the booklet. Do not make the cover design gaudy and thus detract from the idea illustrated. If possible use water-color paints in drawing letters, the tomato, marginal lines, etc. Bind the booklet at the top with a modest-colored baby ribbon or cord. Figure 11 shows title pages drawn and colored by girls engaged in canning work in 1911.

Topics to be treated in the booklet follow. Write a full page on each subject and illustrate as many pages as possible by drawings and pictures.

- (1) Object of the girls' canning work.
- (2) Relation of canning to school work.
- (3) Life history of tomatoes, their uses for food purposes, and where first used.
- (4) Tell how a garden seed bed should be prepared, how cultivated, and what the soil does for the plant.
- (5) Management of plants from cold frame to the maturing of the crop. Tell here how to make cold frames or hotbeds, how to raise plants, transplant, cultivate, stake, and rack up plants.
- (6) Management and treatment of plants for diseases and insects.
- (7) Management of fruit and vegetables; the ripening, picking, and marketing of fresh products. Tell the best method to pack and crate ripe tomatoes. (See Farmers' Bulletin 220.)
- (8) Canning processes, labeling, and the meaning of the label and club emblem.
- (9) Explain the terms "sterilization" and "exhaust" as applied to tomato canning.
- (10) Discussion of uses for tomatoes. Give recipes of important and practical dishes and discuss the food value of the tomato.

(11) Make a drawing and give an account of your club plat. State the total number of pounds produced, how many were used at home, how many fresh tomatoes were sold, the number of cans filled, etc.

(12) State briefly what your canning instruction has done for you in interest, instruction, health, and money.

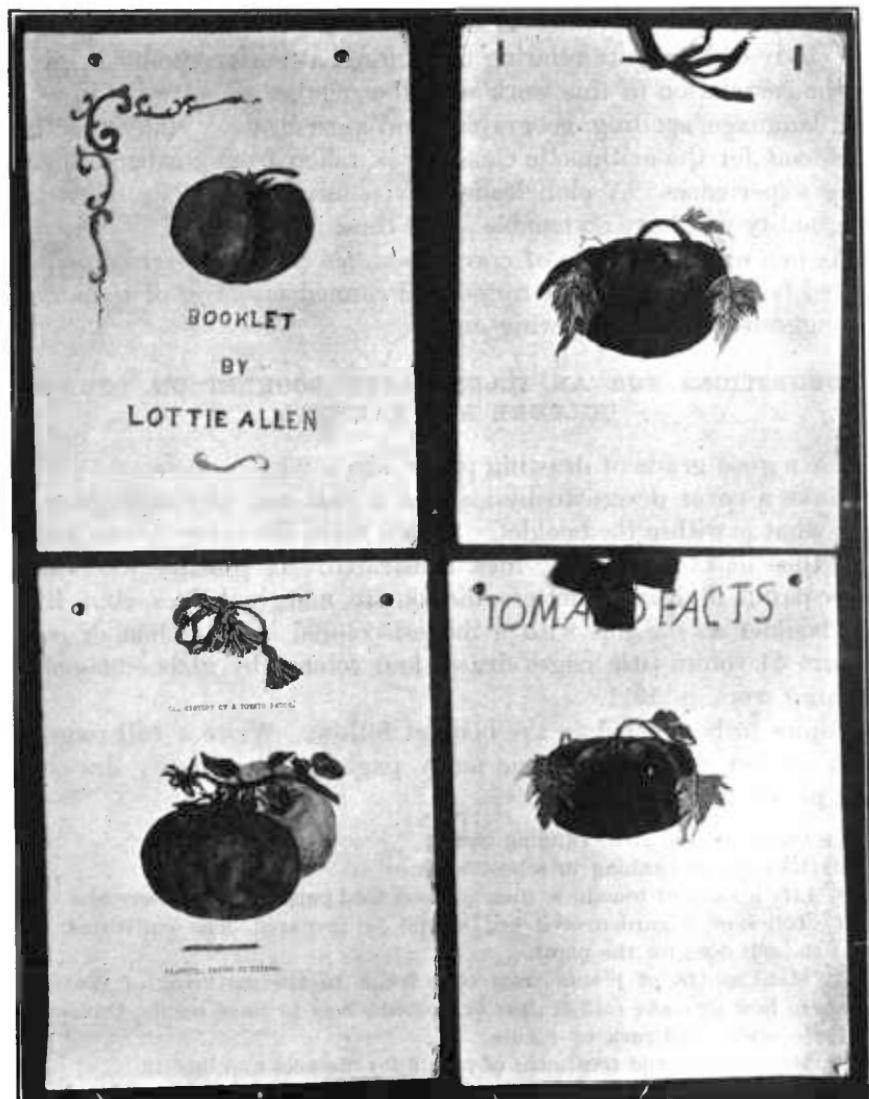


FIG. 11.—Title pages of illustrated booklets on tomatoes, drawn and colored by girls who canned tomatoes in 1911.

The preparation of such a booklet will not only give the club members valuable lessons in composition and drawing, but will lead them to a careful review of instructions and bring to mind their observations in the garden and canning work of the season.

TOMATO-JUDGING CONTESTS.

When the tomatoes have been picked and are ready to market, either fresh or canned, the club members and school girls should use a score card for the study of the tomato.

A convenient type of score card for fresh and canned tomatoes is here shown, the basis of the marking being 100 points. For instance, the color of cooked products has a possible value of 40. If the judges think the color is the best possible, they grade it 40; if it is good, 35; fair, 30; poor, 15; bad, 5 or 0.

The total score for 10 samples is then found and those scoring the highest are awarded prizes.

Tomato Score Cards¹—Fresh and Canned—Ten Samples, One Variety.*Fresh tomatoes.*

Item of score.	Weight.	1	2	3	4	5	6	7	8	9	10
1. Yield of fruit, in pounds.....	40										
2. Size—medium and uniform rather than very large.....	10										
3. Color—normal for ripe fruit.....	10										
4. Uniformity of samples—smoothness, size, color, and shape.....	20										
5. Shape and smoothness—freedom from cracks and surface blemishes.....	10										
6. Evenness of maturity.....	10										
Total score for fresh tomatoes.....	100										

Canned tomato products.

Item of score.	Weight.	1	2	3	4	5	6	7	8	9	10
1. Color when cooked.....	40										
2. Quality of canned product—flavor, pulp, firmness, whole or mushy.....	40										
3. Number of cans per bushel.....	10										
4. Weight of cans and percentage of pulp.....	10										
Total score for canned tomato products.....	100										

¹ These score cards were prepared in cooperation with Prof. L. C. Corbett, Horticulturist in charge, and H. C. Thompson, Expert, Arlington Experimental Farm, Bureau of Plant Industry.

COOPERATIVE CANNING DEMONSTRATIONS.

The Department of Agriculture cooperates with the States in demonstration work and assembles the leaders at least once every year for instruction in the canning of fruit and vegetables at home and in club work. Figure 12 illustrates one of these three-day canning and demonstration schools conducted by the Department for all State and district leaders in Texas in 1912.

GRADING AND CRATING CANNED TOMATOES.

Farmers' Bulletin 220, entitled "Tomatoes," by Prof. L. C. Corbett, will furnish many helpful and valuable suggestions in regard to growing, grading, and crating tomatoes, etc.

The more attractive the container and label, the easier it will be to secure a ready market and good price for products. The eye has as much to do with buying goods as does the taste.

FINDING A MARKET.

After the tomatoes have been canned and the pickle and catchups made, an important part of the work remains, and that is to find a good market for the product. As a result of the pure-food agitation



FIG. 12.—A canning school and demonstration at Tyler, Tex., May, 1912, conducted by the Bureau of Plant Industry of the United States Department of Agriculture for the State and district leaders of Texas.

of the last few years people are demanding a better quality of canned goods and are willing to pay a better price for them. Start out with the idea that there is a good market for your product and do not lack confidence in yourself to find it. Only as a last resort depend upon the grocery stores or commission merchants.

The very best people are most likely to want your products, and these are the ones to see. Many housewives living in the city who leave home for the country during the summer months would gladly give you an order to can enough tomatoes to last them all winter. Dress neatly and go to see all you can, taking with you samples of your products put up in an attractive form. Your goods are worth more than the ordinary canned goods and you do not have to com-

pete with them. You never see "fancy" goods upon a bargain counter; so do not put a cheap price upon your products. Go to see the managers of the best hotels and restaurants in your neighborhood, the stewards of social clubs in the cities, and the managers of railroad dining cars. Cater to a good trade, for plenty of people are always on the lookout for the best products. Go to see these or get some friend to recommend you to them. If you really have something better than ordinary you will have no difficulty in selling it.

No matter what business one goes into it is always best to specialize. This also applies to canning at home. Some girls excel in catchup making, while others have better success with pickles. A little experience will teach you wherein you may excel; then specialize in that line. A lady in Richmond, Va., has made a national reputation with her "pin-money pickles." She began a few years ago in a very modest way, and now her products are so popular that they can be found nearly everywhere in the United States. A lady in Washington, D. C., has built up quite a business making chowchow. She makes this for the social clubs in the city and gets \$3 a gallon for it. Work up your market as you go along and as far as possible take orders ahead. Do not go into canning too heavily at first. Experiment with a few cans and see how they keep. Canning according to the instructions of this bulletin has been successful many times, and a complete failure on your part will mean that you have neglected some important detail or have not followed directions. Do not be discouraged on account of a few failures. It is through failures that one often gets good experience. The writers of this bulletin do not lose one can out of a hundred. With a little practice you can do as well.

CANNING RESULTS IN 1911.

A few records of club girls showing tomato and other canning on a profitable cash basis, taken from 1911 reports, are as follows:

Mary Bullock, Wesson, Miss., size of garden, one-tenth acre.

Cost of production :	Garden receipts :
Rent of land -----	\$1.00
Cost of planting-----	.50
Manure and fertilizing-----	3.00
Cultivation -----	1.00
Gathering -----	1.50
Canning outfits, cans, labels.	8.27
Cost of cannning work-----	4.50
Total expense-----	<u>19.77</u>
Net cost per No. 3 can ¹ -----	.04
Cash sales of fresh vegetables-----	
\$8.00	
Cash sales of canned products-----	
25.00	
Value of vegetables, home use-----	
10.00	
Total receipts-----	
43.00	
Less total expenses-----	
19.77	
Net profit-----	
23.23	

¹The net cost per can is calculated by dividing the total cost of making the crop and the expense of canning by the total output, No. 3 cans being taken as a unit.

Katie Gunter, Samaria, S. C., one-tenth acre of tomatoes.

Cost of yield and canning	----- \$35.33	Cost of home canner	----- \$6.25
Canned products, 770 No. 3 cans.		Sold fresh tomatoes	----- 47.90
Net cost per can	.04	Net profit for season	----- 78.37

Lillie Mae DuBose, Monetta, S. C., one-tenth acre of tomatoes.

Cost of yield and canning	----- \$36.74	Cost of home canner	----- \$6.25
Canned products, 706 No. 3 cans.		Sold fresh tomatoes	----- 26.65
Net cost per can	.04	Net profit for season	----- 60.51

Salena Smith, Brookhaven, Miss., one-tenth acre of tomatoes.

Cost of yield and canning	----- \$33.07	Net cost per can	----- \$0.03 $\frac{1}{2}$
Canned products, 1,008 No. 3 cans.		Net profit for season	----- 67.73

Lou Summers, Brookhaven, Miss., one-tenth acre of tomatoes.

Cost of yield and canning	----- \$41.10	Cost of home canner	----- \$10.00
Canned products, 950 No. 3 cans.		Sale of fresh products	----- 23.50
Net cost per can	.03 $\frac{1}{2}$	Net profit for season	----- 74.80

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